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Foreword

Guest editorial: Special issue on database theory

This issue of the Journal of Computer and System Sciences contains seven invited papers on database theory, which are representative of the latest and most promising research on data management. These papers were selected from some of the top database conferences (the ACM Symposium on Principles of Database Systems and the International Symposium on Database Programming Languages), and were extensively revised and extended following the Journal of Computer and System Sciences refereeing process.

This collection of papers covers several areas in data management. In the paper "Conjunctive query containment over trees", Björklund, Martens and Schwentick study the containment problem for conjunctive queries over trees, and show that depending on the considered axes, the complexity of this problem can be either PTIME or coNP-complete or Π_2^P-complete. In the article "Queries and materialized views on probabilistic databases", Dalvi, Re and Suciu review some recent results on evaluating queries over probabilistic databases and, in particular, describe two techniques that significantly reduce the complexity of query evaluation on probabilistic databases. In the paper "Relational completeness of query languages for annotated databases", Geerts and Van den Bussche compare the expressive power of two approaches for querying annotated relational databases, the first of which is based on making the annotations explicitly available along the ordinary data, while the second is based on adapting the standard query operators so that they have an implicit effect on the annotations. In the article "Succinctness of pattern-based schema languages for XML", Gelade and Neven consider a pattern-based specification language equivalent in expressive power to the widely adopted XML Schema definitions (XSDs), and study the succinctness of the existential and universal semantics of this language with respect to each other, and with respect to the common abstraction of XSDs in terms of single-type extended DTDs. In the paper "Foundations of semantic Web databases", Gutierrez, Hurtado, Mendelzon and Pérez address the challenge of developing database foundations for the Resource Description Framework (RDF), by developing a simple and abstract version of RDF and a query language for it, which capture the core aspects of this framework. In the article "Data exchange and schema mappings in open and closed worlds", Libkin and Sirangelo propose a mixed semantics for data exchange systems, where some attributes of target schemas are designated as open while others are designated as closed, and then they investigate the problems of query answering and schema mapping composition in these systems. Finally, in the paper "On the finite controllability of conjunctive query answering in databases under open-world assumption", Rosati studies the problem of answering queries over a database with integrity constraints under open-world assumption, that is, under the assumption that the facts stored in the database are only an incomplete specification of the data.

I would like to thank the authors of the selected papers for their contribution, and the reviewers for their hard work to ensure the high quality of this special issue. I hope that you will enjoy it!

Guest Editor
Marcelo Arenas
Department of Computer Science,
Pontificia Universidad Católica de Chile, Chile
E-mail address: marenas@ing.puc.cl

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